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PARKMAN (GEO.)

INSANITY.

The following is an Appendix to a book, presented in manuscript to the Trustees of the Gen. Hospital more than a year ago, entitled "Management of Lunatics, with illustrations of insanity, by GEO. PARKMAN, M. D." printed for information of those who might commit sufferers to his charge; the edition of a pamphlet published about four years ago, when he first undertook the charge of insane persons, having been exhausted.

[Read before the Boston Medical Association at their Annual Meeting, 1818.]

DURING the PARLIAMENTARY INQUIRY,* the increase of insanity, in Great Britain, beyond that of population, was mentioned without reference to the fact, that when insane persons become objects of public attention, their number is better known. The same was mentioned in some parts of France, when asylums were enlarged or improved there, on account of the advantages of public over domestic management: also when an asylum near Philadelphia was proposed, 1810, and New York asylum, 1808. In Massachusetts 285 male, 244 female insane persons have come to my knowledge.

* This developed faults in neglected institutions. But the healing art applied to insanity, has ever furnished illustrious examples of men, indefatigably, feelingly, and enlightenedly devoted to their toils, discouragements, responsibilities, privations, and perils. I desire publicly to express my obligations to that head of Psychological science, M. Pinel, to whom I was indebted for seven months' welcome access to the theatre of his successful labours in Paris. He early undertook the private charge of insane persons. Afterwards he was called to the medical superintendence of an asylum of 300 insane men. The last 16 years he has been medical superintendant of one much larger for women. He has ever given best proofs of qualifications requisite to his station. The results of his experience are weightier, coet. par. than the dissenting opinions of others of less experience in these subjects. His ripened years, 73, enjoy double experience in M. Esquirol, his former pupil, conductor of an excellent asylum for 20 insane persons. Ideas resulting from M. Pinel's experience gain additional force by passing before the eye of another intelligent, vigorous examiner. Had I not otherwise occupied much of this number of the Journal, I should refer to numerous similar obligations, in performing a sort of promise I made in a letter to one of the Editors, published in the Journal Jan. 1813, and which was copied into Lond. Med. and Phys. Journ. Jan. 1814. The

ANALOGY BETWEEN SANITY AND INSANITY.

Some insane persons having exhibited wonderful changes from their ordinary state and conduct, insanity, according to the common notion, divests its subjects of the properties common to man, and represents them under states and ailments, opposite from our common nature. To these specific states and ailments specific management and medicine are thought necessary: till these are discovered, the subject is in a mystery thought to warrant the vaguest speculations.—Consideration of the most striking extravagances of insanity in connection with phenomena of sanity analogous to them, as in “*Management of Lunatics &c.*” p. 6—7, shows sanity and insanity are homogeneous, differing but in shades. Many bereft of reason are like children not having it mature. Some are not unlike people fallen from eligible situations, who persist in notions fitted only to their former stations; E. G. heads of families, accustomed to command, are unwilling to consider themselves under direction.

Aversion from society, desire of retirement, is seen in the sick, as in some insane persons.

Agitating the fingers, feet, head or body, walking up and down, muttering, humming, whistling, singing, biting the nails, among sane people, often seem analogous to the violent motion and raving of insanity, and resulting from vacancy of a mind unfixed.

Some see confusedly, like one half asleep, drunk, or dizzy; in reading, letters seem to run into each other.

Involuntary action, and inaction. Inactivity of the will, and indecision, though often exhibited by sane people, are specially characteristic of low spirits and melancholy, and form principal points of treatment. Dr. Gall told me of a mother, who said she felt an almost irresistible impulse to kill her children. She had several times carried one of them to the river, but momentary horror restrained her. She had sometimes sharpened knives and placed them under her pillow. Her husband, esteeming her a pious and affectionate mother, treated her anxiety lightly. Dr. Gall advised her to absent herself from her family, as soon as she should first feel the approach of these attacks.

Daily other instances occur of inactivity of the will, which, though not designated specimens of disordered intellect, no

promise refers to a descriptive account of such asylums for insane persons in the British empire, France, Italy, and Switzerland, as are most likely to offer themselves to the medical traveller's convenient inspection. Outlines of this account, embracing 94 separate receptacles for insane persons, were presented in manuscript to the Trustees of the Gen. Hospital, before their asylum for insane persons was planned.

more than transient uneasinesses are called sickness; yet, though generally subsiding spontaneously, or without great curative means, may be the nucleus of great mental ailments; E. G. staying in bed late, when we wish ourselves out of bed, and make fruitless efforts to quit it: also at the fire-side, at table, and in pleasant society. In anger we sometimes use expressions and actions disapproved by our experience and the looks of those about us. In high spirits we sometimes act so sillily and extravagantly, even friends half amused pleasantly call us light-headed, half-crazy. Then we say—resentment, or pleasant ideas overpowered us.—So insane persons sometimes say—I could not help it—I forgot. They sometimes beg to be restrained, to supply self control. In situations seeming partly bereft of motives to excite the will, see the idleness of the rich heir, the listlessness of the pauper who finds near him no means of employ immediately adequate to his need. Under the head here referred to are those conditions called states of temptation. People on an eminence feel strong propensity to leap down. Similar states appear in cattle, when their barns take fire; and in birds *charmed*.—Here I cannot help adverting to the frequent coincidence of suicides, specially among friends and persons similarly situated. The knowledge of such acts seems too horrid for some persons' consideration; the impression so fixed, they kill themselves, apparently to be rid of it, as some convicts ask immediate execution, to save consideration of death; or as some patients, almost distracted in expectation of a surgical operation, are firm in suffering it; or as some shipwrecked people leap into the sea, rather than view probable destruction. See also "Management of Lunatics," p 8, l. 9.

* * after the suicide of his bosom-friend, being several times accused of attempting to follow his example, said—though the world presented to him but little to live for, his friend's suicide had so painfully affected him, there was no danger he should follow his example.—He shot himself six months after his friend, holding in his hand a prayer for a person in the agonies of death. I know other analogous cases.

When repeated suicides occur in a family, they are often imputed to hereditary insanity, without reference to the circumstances above mentioned.

Suicide by drowning, shooting, throat-cutting, and poison sometimes occur when the individual chances to be near the water, or to be using fire-arms for common purposes, or when he shaves, or chances to meet with poisonous substances; though a walk to the water, sporting, and shaving are often resorted to to effect suicide without exciting suspicion. Almost every

body is occasionally indifferent to life, especially in the nauseating and depressing stages of some diseases. Under such circumstances, should they be placed in situations offering great facilities for suicide, such an attempt would not be surprising.

Persons seemingly disposed to suicide should be kept from objects likely to excite their disposition; manifestations of it are to be met by most discriminating management tending rather to divert it from its purpose than evidently to thwart it. This was signally evidenced by Dr. Willis, according to a narrative I received from a physician to whom Dr. W. communicated it. The King proposed one day to shave *himself*. Dr. W. feared to hesitate in assenting, lest he should seem to suspect the King of intended suicide, and give him dangerous notions, of the pre-existence of which there was no certainty. Dr. W. called for the razors, and in the mean time engaged the King about some papers on the table. The razors were put on the same table, the King still attended to his papers, which encouraged Dr. W. to believe suicide was not intended. After shaving, the King returned to his papers; the razors were not removed immediately, lest Dr. W.'s anxiety about possible mischief should appear, and occasion a dangerous train of thought.

Of 93 suicides in and near Boston, 19 were committed by females. Propensity to suicide has repeatedly seemed arrested by strong counteracting impressions. * * * in mid-winter tried to leap into the neighbouring sea. As she passed, I had thrown on her a tub of water. This producing a vivid impression sufficient to attract her attention from her purpose, she ran back shivering, and never repeated such attempts. Cheerful scenes gave her only transient diversion; the contrast from them she found in her situation depressed her. I showed her the whole interior of the almshouse; the distressed objects here convinced her she was not "the most wretched in the world" as she called herself. Such modes of relieving melancholy deserve attention. Few persons rightly value their advantages, not knowing other's sufferings. Most men think more of their troubles than if they knew those of others. Cheerfulness often irritates melancholics, as singing and levity is offensive to some people occupied by thought.

Lord M. requested our distinguished artist, Gilbert Stuart, to paint a portrait of his Lordship's brother, Capt. C. P.—The artist, considering this no common call on his talents and friendship, availed himself of much familiar intercourse with Capt. P. to witness in him those variations of countenance which best exhibit characteristic animation.—Lord M. saw the portrait, and exclaimed, with a sigh, "it is not my brother, it looks like an insane man!" In consequence, the artist had

another sitting with Capt. P. Lord M. saw the portrait again, and exclaimed "it is yet more like an insane man!" Three weeks after, Capt. P. shot himself. This, which might be thought the result of momentary impulse, seems a consummation of a mind in which disease had accumulated: insanity seemed to show its early stages. We cannot foresee the particular extravagances it may exhibit, but we can use precautions likely to obviate probable evils.

Sensibility, and insensibility to heat, and cold. In some persons of great energy, vital heat seems superabundant. They wear no great coats, under-dress, gloves, or boots; sleep on a lightly-covered mattress, open the window at rising, dress and undress in the cold, use cold bath in winter. Charles XII. of Sweden is said to have slept in mid-winter in Norway, in the open air, on straw, or a plank, covered only with a cloak. Another warrior is said to have harangued his army an hour in the streets of Warsaw, clad in white dymity. I know no insane persons' resistance to cold, more wonderful than is exhibited by mariners on our coasts. Sometimes in our coldest nights a wave cases their clothes with ice, when they dare not quit duty a moment. Their resistance seems to depend on strength with mental energy excited by danger; in insanity, by a real or supposed state of things exciting energy. Security from cold seems to depend partly on the same mental principles by which some persons are unhurt among apparent contagion.

Others, with the various preservatives of heat, are chilly, and pass the winter in trying to be warm. In some, insanity is so depressing, and inactivity so great, their susceptibility of cold is not strange. Hence the importance of encouraging activity in them in winter. * * * at. 17, had his toes frozen a very mild night, middle of Oct. in a close room 6 ft. sq. He gave no previous intimation of suffering. Two others died, apparently chilled to death, Oct. a year before, in a warmer climate, the weather very moderate. Some will not be clad, others inadvertently kick off the bedding. If crawling infants play as long as they please in parts of a room distant from the fire, in severe weather, their fingers, ears and nose will be half-frozen, without interrupting their pastime. Intermittent fevers present opposite extremes of temperature showing little connection with atmospheric influence.

Some who have been insane and relieved never recover their force of mind, as some who have had bodily disease never recover their firmness.

Those who have been insane are very susceptible to exciting causes, as those who have had bodily disease.

* * * had an epileptic fit at a lecture in C. When it had subsided he knew not the place he was in, nor how he came there. Presently he remembered, in the order of occurrence, coming to C,—for a lecture,—entering the chapel,—the prayer,—text,—introduction of the lecture.

Painful dreams seem to result generally from baneful habits, ill health, or a mind disturbed when awake.

CAUSES.

In taking charge of insane persons, their friends' conjectures of the cause of the ailment have sometimes been given me. In 25 cases, physical causes have been mentioned; in 27, moral.

I have witnessed at least 24 other cases, with the origin of each of which, physical and moral circumstances seemed intimately connected.

Is hereditary influence a merely physical cause? At least 30 cases imputed to it by friends have been presented to me; 2 others combined with other or additional moral circumstances.

1	„	„	„	„	„	„	physical	„
3	„	„	„	„	„	„	and moral	„

Three other insane persons have been committed to me, because their presence showed injurious effect on some of their family. A person told the physician of an asylum I visited, —with a near prospect of marriage, he thought of one or two instances of insanity among his relations, he had painful doubts as to the propriety of fulfilling his marriage contract.—He now inhabits that asylum, perhaps from dread of insanity, from painful scruples, from disappointment, from reproaches or suspicions of his intended relations, aggravated by maniacal predisposition. This is not a solitary case.

In eight cases insanity was imputed by friends to intemperance in strong drink.—In five others, before decided insanity, intemperance and other circumstances physical and moral co-existed, apparently conducive to insanity.—In three others, intemperance coexisted with moral circumstances; which I believe frequent; intemperance destroys property and estimation, and begets disappointment, despair, &c.; strong drink is often resorted to, to exhilarate depressed minds.—In three others, hereditary and moral circumstances coexisted with intemperance.—In another, hereditary with intemperance.

Some persons, habitually temperate, previous to exciting suspicion of insanity show propensity to strong drink. Is not this an early *effect* of their insanity?

Some persons after long intemperance may be debarred from strong drink. Others may be supplied from a set of vessels the capacity of which lessens in almost imperceptible gradation; or by diluting the draught; or by less stimulating sort of drink. I have satisfactorily substituted nice coffee, or strong hot mint tea, or high-seasoned solid food. A child had got into use of opium at night. I occasionally lessened the opium a quarter, without his knowledge, and added rhubarb to preserve the accustomed size of his pills. He always discovered the difference.

A person has been presented to me insane apparently from "home-sickness." Such patients generally try to hide the source of their uneasiness. Those seem most exposed to it who have been accustomed to industry, temperance, domestic enjoyment, retirement, and scenes peculiar to their home.

Insanity after bodily diseases seems often imputable to them; to anxiety as to their event; to affairs embarrassed, or supposedly embarrassed by them; to shame, when they rise from beginning vice; to premature return to accustomed occupations: all these aggravated by susceptibility increased by disease. Insanity after childbirth should be viewed in connection with the changes consequent on sudden removal of distention and weight; new secretion and discharge, with their causes and consequences; sudden joy, and relief from anxiety; sometimes disappointment and new anxieties; exertions induced by friends' congratulations. Of insanity apparently from more or less of these combined causes, at least eight cases have been presented to me.

A person with great irritability, impaired memory, unpleasant dreams, shame, doubt, discouragement, and sense of moral depravity, asked me if his disease did not tend to weaken his intellect: if I did not think he had less sense than others? I asked as to his success in life. "He had prospered the last two years." I named to him one of his acquaintances, who had not prospered, yet thought well of himself. I concluded, apparently to his satisfaction, my patient had most sense of the two.

Many cases of insanity, imputed to intense study or bodily labour, occur under exertions conducted in ill health, prejudicially, or about objects perplexingly various, doubtful, or distant in event; then, study and labour show no necessary connection with insanity; they generally seem highly preventive and curative of it.

Besides the general apparent agency of climate, and change of seasons in causing disease, lassitude opposed to salutary exertion attends people exposed to warm seasons.

Dr. Wistar, one of the Friends, told visitors to Pennsylvania asylum for insane persons,—insanity among the Friends seems often imputable to unduly active imagination exerted about the spiritual faculty they believe men have independent of intellect.

Insanity is often attributed to circumstances showing nothing specific apparently capable of producing it. Any exciting or depressing cause, acting on persons predisposed to insanity, may be followed by action of the predisposition. This remark seems applicable to some cases of insanity imputed to avarice, disappointed love, and religious enthusiasm. Five cases imputed to religious enthusiasm have been presented to me; one of them combined with disappointed love, another with other moral causes, another with physical causes. See also “*Management of Lunatics*,” &c. p. 8—13.

To investigate thoroughly the causes of insanity, we must consider those pursuits of men which prevent full action of the intellect, also the general destitution of fixed principles, and the insubordination specially of the young to their natural guides. It may be necessary to fix a general period, styled the season of discretion; this ought not to be acknowledged when it proves false. As soon as an individual shows insensibility or disregard to the safeguards of his estimation or property, whatever be his age, it is the natural right and duty of those most interested in his welfare to seclude him from objects which excited and maintain his delusion. If they scruple to perform this duty, they are responsible for his consequent derangement or vice, the probable results of undirected minds impelled by excitement. See also “*Management of Lunatics*,” p. 30, l. 16.

To ascertain existence of insanity or feint of it, unless the examiner’s object be concealed from the patient, the enquiry must be extensive.

A physician in this town asked me to see a female in his house, whose conduct was strange. He doubted whether her strangeness was involuntary, or assumed on account of some domestic crosses. I went to her chamber on pretence of seeing the house with a view of hiring it. Being left with her, I asked her why she put her hands to her head? She said, “she believed she had lost her head!” From such expressions, and from her general air, I concluded she was insane or knew how to feign insanity. The first was true.

The strongest evidence I know of certain changes in insane persons, at certain lunar periods, is in "De l'influence de la nuit sur les maladies. 231—235. à Bruxelles, 1816."

RESTRAINTS.

See Management of Lunatics, &c. p. 26₂—26₃

I know no sure proper means of confining the upper extremities of ingenious patients, perseveringly impatient of restraint, but a canvass-strait-jacket, the lower parts of the arm-pockets sewed very strongly, the back held together by buckles and wide straps instead of cord, the bottom secured round each thigh by a strap or string.

The following means may be exactly proportioned to extravagance or resistance, and are less heating and irritating.—To confine the fingers, thick leather mittens without thumbs, the palms covered with sole-leather, the mittens secured round the wrist by a wide and strong strap, with a metallic ring, through which a cord may pass, to hold the hands behind.—In sitting and lying, the hands are kept in front by a cord passing through a staple in the floor near the feet.—To confine the ankles, similar straps, the cord through the rings passing through the staple.—To confine the breast, a strap round it and the back of the chair.—To confine the thighs, a strap round each of them and one of the chair's hind legs. The chair is fixed.

When restraints are easy, and exclude idea of escape, irritation and revenge consequent on painful restraint, and risk and uncertainty are prevented, and the sufferer is impressed with the advisableness of submission, and with respect for Directors able to accomplish judicious measures.

Restraint, unless conducted with judgment, is likely to increase fury, excite hate, revenge or despair. Each patient's situation and relations in life are to be considered. Whatever peculiar measures are advisable are to be executed with a persuasively commanding tone of conscious power, and without a chance of exciting ludicrous ideas.

Properly constructed double apartments for each patient present most efficient and easy means of requisite general restraint and quiet. See plate described in "Management of Lunatics, &c." p. 27—30.

In Mass. asylum for insane persons the window-sashes are ash,—glass, 6 in. by 8, 24 panes,—stiles and top-rail 2 in. sq.—bottom-rail 2½ by 2,—meeting-rail 1½ by 2,—intermediate bars 2 by 1. Upper sash falls, lower sash rises 7 inches. The

room doors are fastened by a mortice or box-lock or bolt, kept in its place by a spring, and moved by an arm attached to the tumbler which is turned by a square socket perforating it to receive the key. The box is 3 in. sq. $\frac{3}{4}$ in. thick. The bolt and sash were recommended by one of the Trustees*.

MEDICAL TREATMENT.

Of the action and state of the brain and nerves during life, as of many internal parts, we know but little. Their minute structure shows their functions but imperfectly. The time of commencement of morbid effects and peculiarities apparent on dissection cannot be known, nor the connection between them and insanity, nor whether many of them have not taken place since death, or are consequences of previous affections not now apparent. Insanity like other diseases sometimes leaves no visible traces after death.

In what part of the system disease begins, in any ailment, we seldom know. Its origin is seldom so marked that its primary symptoms are noticed. It first excites attention generally by several coexisting phenomena interfering with the individual's comfort, and apparently emanating from parts remote from each other. If intellectual "derangement" be a primary affection, but little can be known from the sufferer's account of its origin. When bodily ailment precedes insanity, we seem to have more light at first: but we cannot, from the sufferer's experience, trace the steps by which physical ailment blends itself with intellectual.

In a system intimately connected, affections are participated according to each part's susceptibility. Some parts, remote from the apparent or supposed original seat of the morbid action or affection, are sometimes more pressingly disordered, and seem first to ask aid. The healing art consists often in seizing these indications and relieving such parts: renovation is thus participated through the system, and satisfactory results follow the judicious physician's labour, characterized by energy and patience, though often by doubt. Health consists in the due action of each bodily organ; what plan is so likely to cure/disease, as that which tries to restore each organ to its accustomed action,

* Ebenezer Francis, Esq. under whose special superintendence the buildings have been erected.

Here we may offer the meed of praise in mentioning the respected names of Francis C. Lowell, and Geo. G. Lee, separated by death from active agency in this work of humanity. It will be a more durable, honourable, and useful memorial of them, than any which could be raised by friendship or respect.

in the order of apparent severity of its respective ailment. The records of five lunatic asylums give together 5351 admissions, 2792 cures. Even idiots have acquired or recovered some reason, after a steady course of judicious discipline; many such cases seem attributable to baneful habits, or mismanaged insanity.

Few bodily ailments presented in insanity seem essential to it. They are as various as the symptoms of other disorders, and resemble them.

In every step of the medical treatment, it seems specially advisable, considering the imperfection of our knowledge, to bear in mind the constant tendency of the diseased system to spontaneous changes, generally salutary, to which physicians are often indebted for "the triumphs of art." Medical applications should be made in a manner least likely to interfere with such tendency. Imitations are attempted of these salutary changes. But we can know the external marks only of these changes, perhaps their effects only. Our production of some appearances like nature's may be mistimed, injurious, and is not likely to be attended with such combination of circumstances as precede natural changes, and without which similar effects are not to be expected.

In undertaking the charge of an insane person, we should bear in mind—it is not unlikely his disease will not prove transient; it may be very long, very violent; his physical powers may be exerted by it to their utmost, though they may now seem equal to great exertions. Under such circumstances I have been told by patient's relations, "we have no hope of relief for our friend, but from a process by which his maniacal vigour shall subside under general prostration." So often is disease aggravated after such prostration, and such satisfactory results follow the system referred to in "Management of Lunatics, &c." p. 22, expedients, the good success of which is not at least probable, seem inadvisable.

Some patients when first presented to me exhibit obstruction of bowels, with great extravagance and violence. Under such circumstances, a *purge* or *cathartic* may be needed. Daily discharge from the bowels seems indispensable to good success: for this, *laxatives* seem best, as they leave the bowels a chance of resuming their functions. Inordinate action of the bowels induced by purgatives, is followed by corresponding inaction; this renders necessary a repetition of the purge, &c.

If under use of mercury as a laxative, *mercurial* action appears, its worth as a remedy will be known. I have seen thin persons, one of them insane, emaciate under unsuccessful attempts at salivation.

The case in p 5, 16 b. was very severe; it presented no mark of amendment till after the accident: from that time it began to mend, in four months it recovered. The irritation, and discharge from the feet seemed highly useful. A great variety of analogous cases show the same.

A labourer, under most severe erysipelatous inflammation of his face, his eyes and ears closed, was uninterruptedly delirious, fancying himself lifting heavy bales, made corresponding exertions, and sweated profusely. Thinking this would soon exhaust him, I thought it necessary to change the train of his ideas. Thinking nothing likely to do this but a most vivid physical impression, I produced a great irritation on his crown; he did not recur to his delusion, and became in a situation to receive the remedies to which his restoration seemed owing.

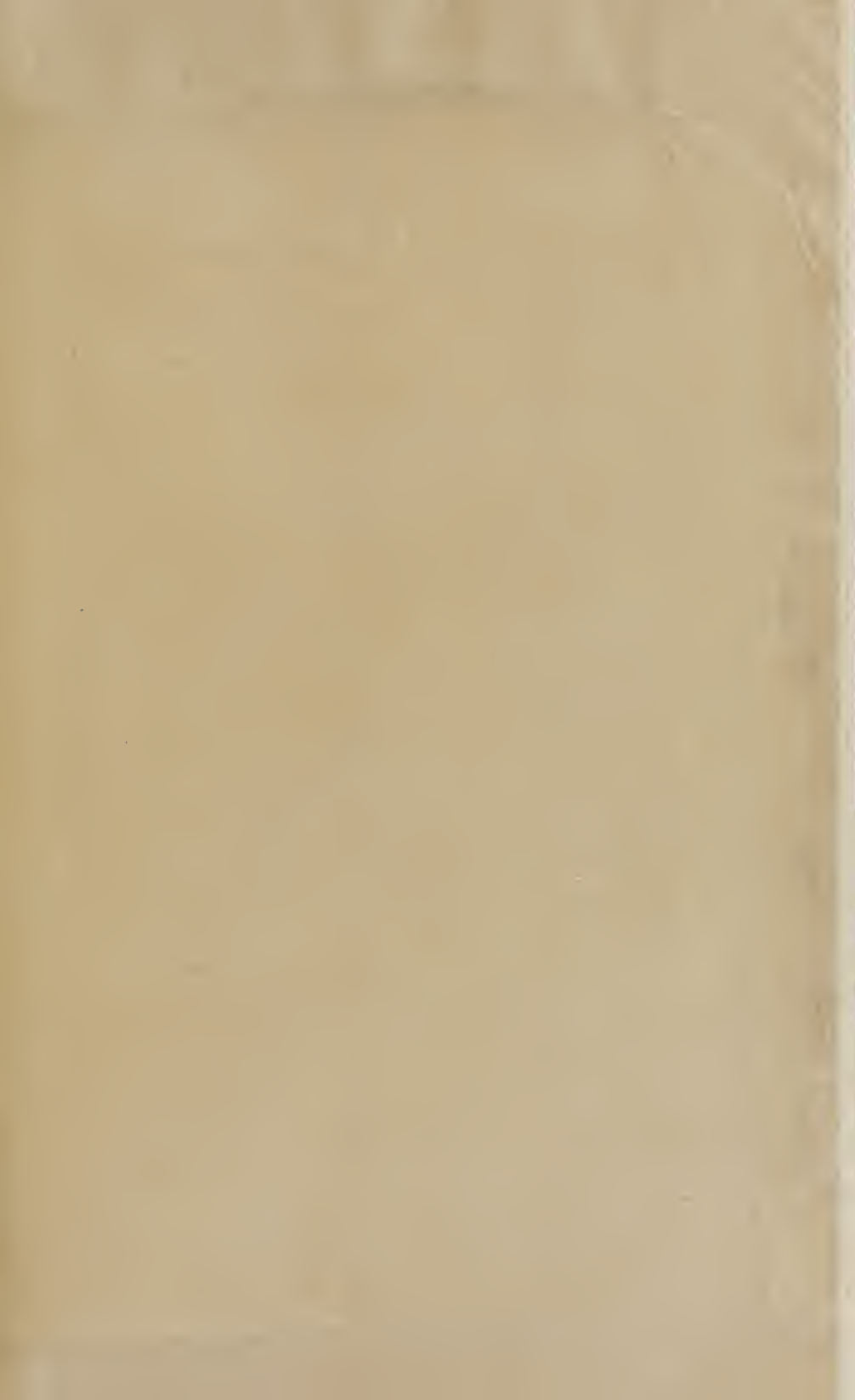
A slender female, uninterruptedly delirious, constantly stamped with her feet. To interrupt this exertion, which threatened to enfeeble her irrecoverably, I advised blisters to her soles. I have given similar advice for patients disposed to run away, kick, or strike, when this seemed preferable to other restriction.

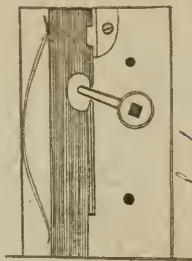
Some foreign medicines used in insanity have been shamefully adulterated; others, even of domestic origin, mistaken. Hence, and from the difference in the physical and moral management of different patients, and the diversity of disease, rise some discordant accounts of medicines.

Much advantage has been attributed to the warm-bath, at 82° to 88, combined with the *douche*, i. e. the patient, under excitement, being confined in the warm bath, by means of a wooden cover to the tub, with a notch for his neck; a stopcock from a reservoir above is turned, so cold water falls on his head by drops, or in a small stream. The falling water is generally an object of terrour. Perhaps a vapour bath, described in Lond. Med. and Phys. Journ. No. 205. may be used for the warm bath.

Feb. 24, ev'g. died Archibald Bruce, M. D. æt. 42, Physician to New York asylum for insane persons from its establishment; 'endeared to numerous friends by acquirements, integrity, generosity, and hospitality.'

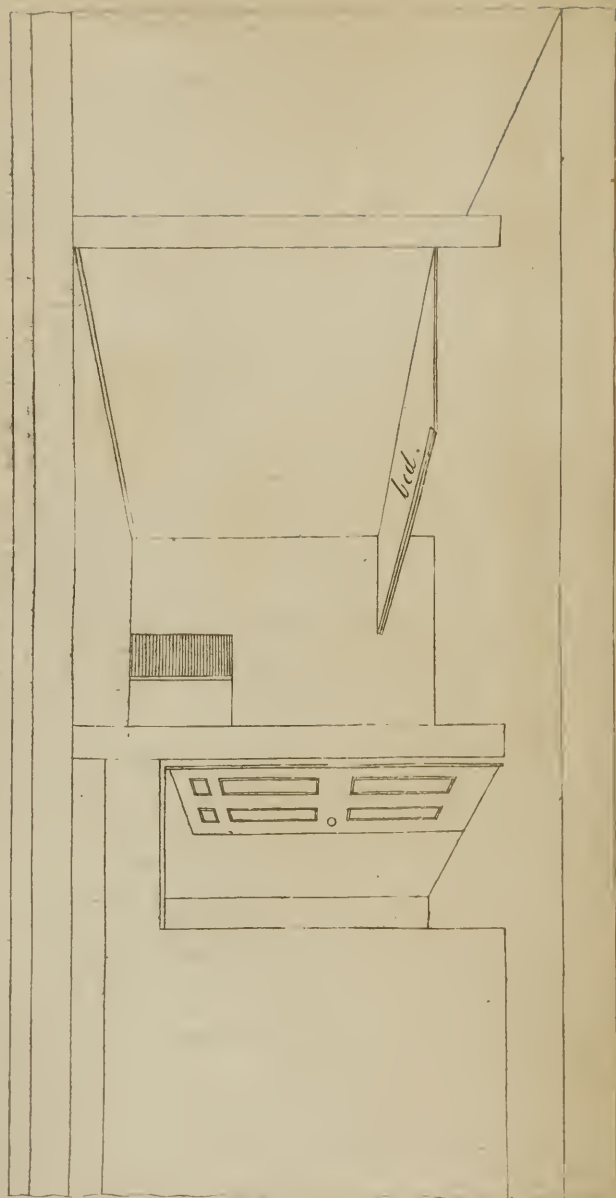
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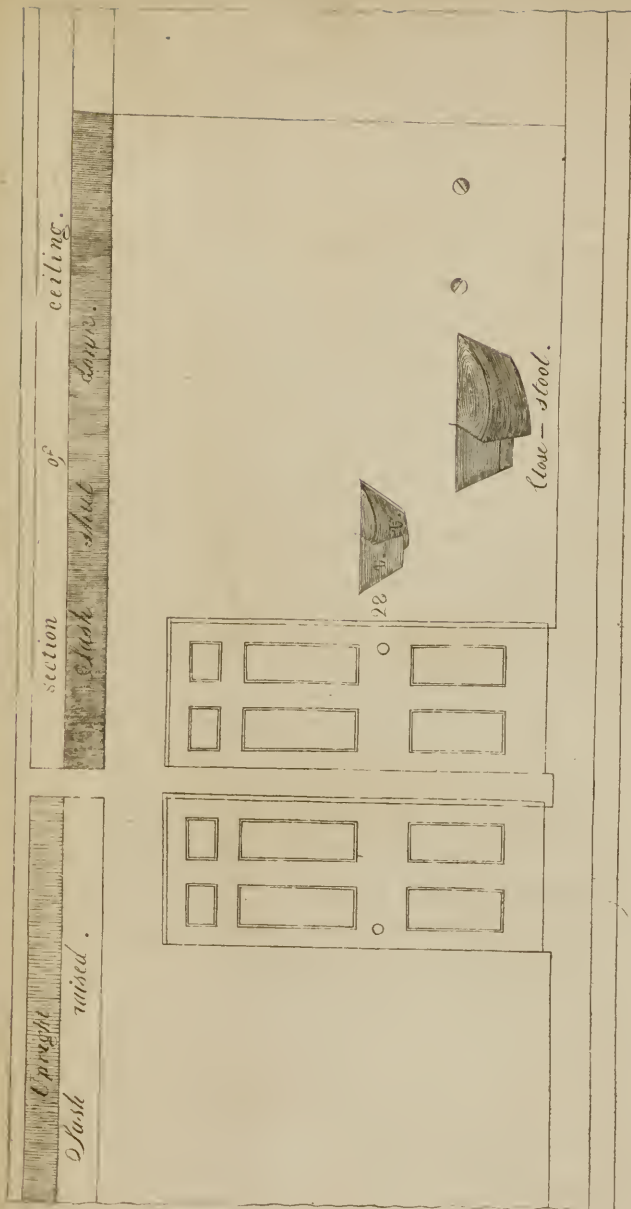




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Insanity

G. Parkman

1818

National Library of Medicine

Bethesda, Maryland

CONDITION PRIOR TO TREATMENT

There was no cover. The sewing was intact. The wove paper text was very brittle, and discolored with many edge losses and tears at the head, tail and fore edge. There was a label adhered to the front, with an inked inscription. The first leaf was stained from adhesive from the label. The text was stained from water throughout. There were library stamps in the text, on the front page. The surface pH of the text was 5.8.

TREATMENT

The text block was disbound. The first and last leaves and heavily soiled leaves were surface cleaned with grated and solid white vinyl erasers. The text was washed in calcium enriched deionized water and deacidified in magnesium bicarbonate (1M solution in water). The leaves were lined recto and verso around the text with acrylic toned handmade Japanese paper and methyl cellulose. The book was re sewn by hand with unbleached Irish linen thread with the addition of new end leaves of handmade paper. The spine was lined with both Japanese paper using wheat starch paste, and unbleached Irish linen with PVA adhesive. The book was recovered in a non-adhesive paper cover reinforced with acid-free buffered board. The surface pH after treatment was 8.2.

